Summary of EPA Class III UIC Aquifer Exemptions

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Dewey-Burdock	Uranium	R8	**Draft** (Application submitted 2009, Draft Permits issued in 2017 and 2019)	The AE is derived from a science-based calculation using site-specific properties of the injection interval aquifers and considers the distance that a potential excursion could travel prior to being detected and recovered. The maximum distance that a potential excursion could travel before detection (ΔT) is approximately 47 feet based on the geometry of the monitoring well rings. The estimated distance of potential excursion migration between initial detection and implementation of excursion recovery (Δd) is 24 feet based on a Darcy calculation using a hydraulic gradient representative of a wellfield imbalance that could cause an excursion. The dispersion factor (DF) is estimated as 10% of the total travel distance or 47 feet. The science-based calculation of 118 feet for ΔEb was rounded up to 120 feet for ease of surveying and plotting on maps. A distance of 120 feet provides a reasonable extension beyond the monitoring ring boundary to enable uranium recovery while remaining protective of the USDWs located outside the exempted portions.	AE boundary line is set 120 feet from the perimeter monitoring well rings. After delineation drilling identifies the horizontal extent of the ore deposits in more detail, the ore deposits may be slightly larger than they are shown. Based on the horizontal expansion of the ore deposits, the perimeter monitoring well rings may move slightly outward from the location shown in Figure 3, because they are located 400 feet from the injection and production wells completed in the ore deposits. A shift of the perimeter monitoring well rings would result in a corresponding shift of the AE boundary, because it is located 120 from the perimeter monitoring well rings. Powertech does not expect the shift in the AE boundary to extend farther than the boundary located ¼-mile away from the ore deposit boundaries shown in Figure 3. Therefore, the maximum possible extent of the final AE boundary would be the line ¼-mile away from the ore deposits as shown in their current locations in Figure 3. In most cases, the AE boundary will not extend that far. In order to extend the AE boundary past the ¼-mile boundary, Powertech would be required to submit a new AE application, which would trigger the public review process.	1, 2

outward from the location shown in Figure 3, because they are located 400 feet from the injection and production wells completed in the ore deposits. A shift of the perimeter monitoring well rings would result in a corresponding shift of the AE boundary, because it is located 120 from the perimeter monitoring well rings. Powertech does not expect the shift in the AE boundary to extend farther than the boundary located ¼-mile away from the ore deposit boundaries shown in Figure 3. Therefore, the maximum possible extent of the final AE boundary would be the line ¼-mile away from the ore deposits as shown in their current locations in Figure 3. In most cases, the AE boundary will not extend that far. In order to extend the AE boundary past the ¼-mile boundary, Powertech would be required to submit a new AE application, which would trigger the public review process.

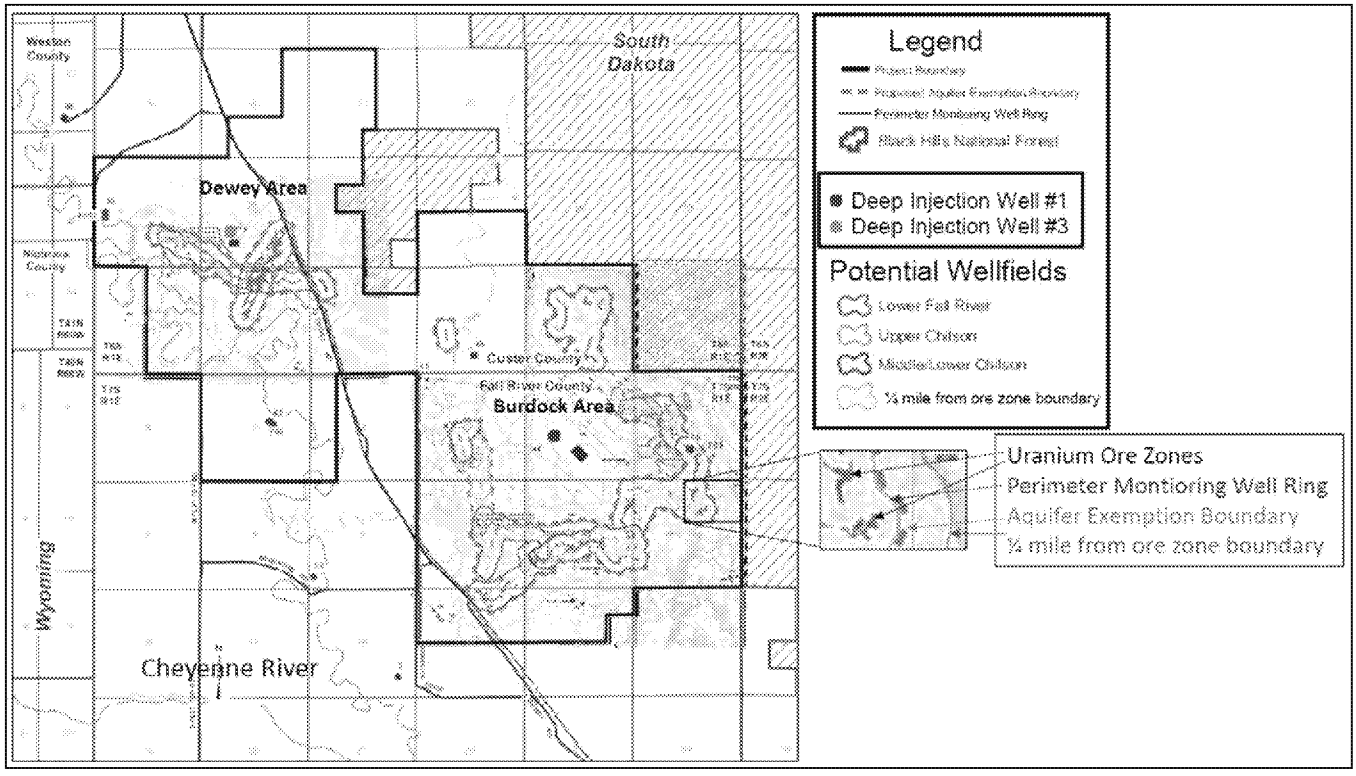


Figure 3. Areas of the Inyan Kara Group aquifers proposed for exemption.

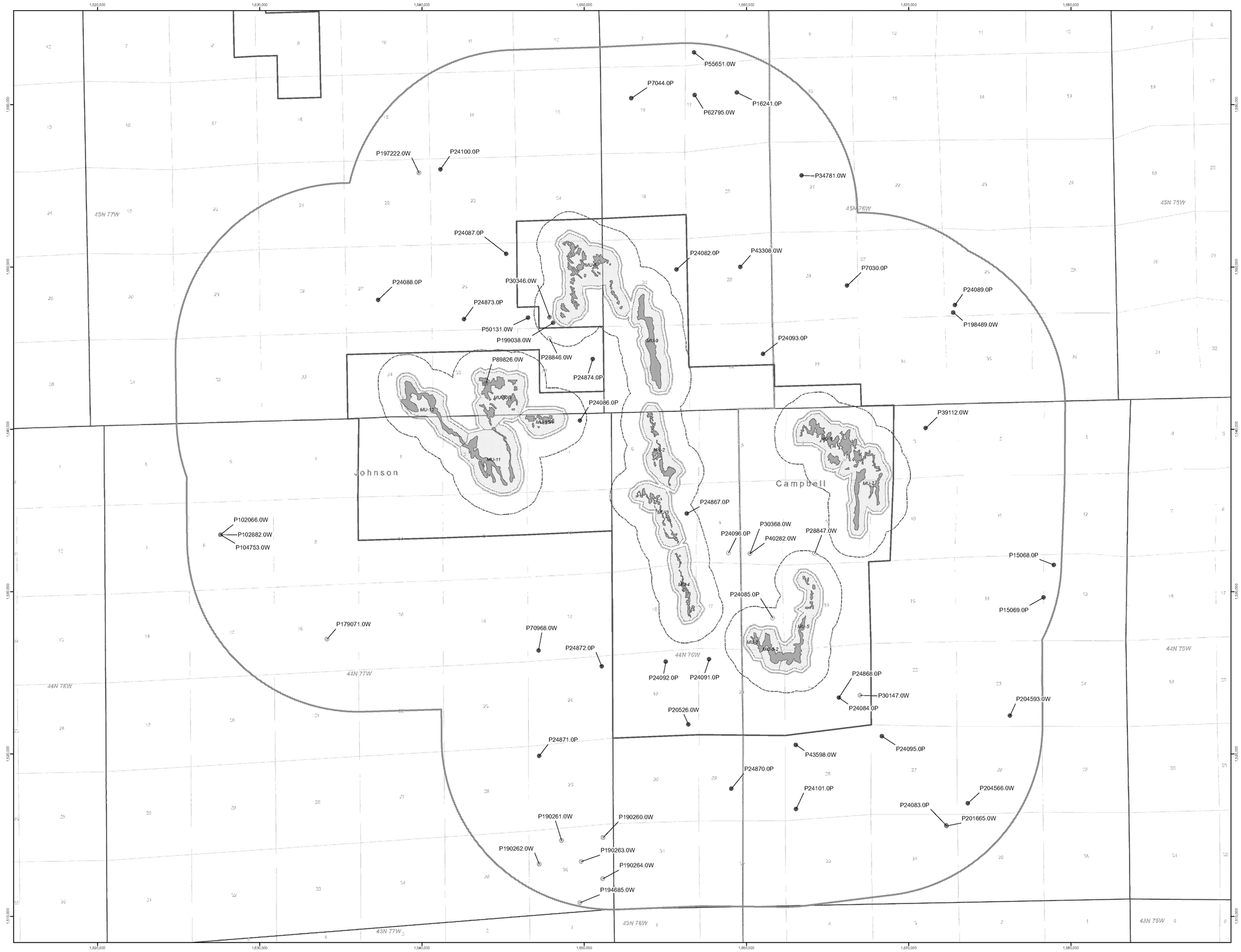
Placing the AE boundary 120 feet from the perimeter monitoring well ring is the same approach as proposed in the previous 2017 AE Record of Decision document. The EPA is now clarifying that the AE boundary may shift slightly outward from the location shown in Figure 3. The AE boundary will not shift beyond the boundary located ¼-mile from ore deposits as they are shown in Figure 3.

Water Quality – Total Dissolved Solids (TDS) (mg/L):

Fall River Formation of the Inyan Kara Group: 773.85 mg/L-2,250.00 mg/L; mean TDS=1,275.01 mg/L, based on the summary of groundwater quality analyses in Appendix N of the Class III Permit Application.

Chilson Sandstone unit of the Lakota Formation of the Inyan Kara Group: 708.33 mg/L-2,358.33 mg/L; mean TDS=1,263.38 mg/L, based on the summary of groundwater quality analyses in Appendix N of the Class III Permit Application.

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Willow Creek (Formerly Christensen and Irigaray Ranch)	Uranium	R8	Amendment to add buffer in WDEQ PN	U1 has calculated the aquifer exemption boundary based on groundwater hydraulic properties of the "K" Sandstone. A scientific calculation of the aquifer exemption distance past the monitor well ring has been prepared that includes several components. A scientific calculation of the additional distance beyond the monitor well ring has been prepared that includes several components. One component involves a simple trigonometric calculation of the distance that a potential excursion could extend beyond a monitor ring outline before being detected at a monitor ring well (assuming radial flow). This factor is referred to as ΔT. The second component involves the distance that the excursion can travel from the time of initial detection to the time that recovery operations are implemented (indicated as Δd). The final component is a dispersivity factor (DF) that is applied to account for heterogeneity in the subsurface that can result in movement of an excursion beyond the distances calculated using assumptions of a homogenous isotropic aquifer system.	The aquifer reclassification/exemption boundary (AEB) will be designated as 176 feet beyond the monitor wells rings for each Mine Unit within the CR area. The proposed AEB presented on Figure D12-2 with respect to the existing Mine Units 2, 3, 4, 5, 6, 7, 8, and 10, as well as the proposed Mine Units 9, 11, and 12.	3



Legend

USES

- DOM_GW (1)
- DOM_GW; STK (5)
- IND_GW (1)
- IND_GW; MIS (3)
- MIS (11)
- MIS; STK (1)
- STK (36)
- STK; MIS (1)

- Mineralization Areas
- Christensen Ranch Permit Boundary
- Christensen Ranch 2 Mile Buffer
- Mine Unit
- Proposed Aquifer Exemption - 176 Ft. Buffer
- Mine Unit - 1/4 Mile Buffer

N

0 0.5 1 1.5 2 Miles

1 inch = 2,640 feet

Projection: Wyoming State Plane, East-Central, NAD83 (feet)

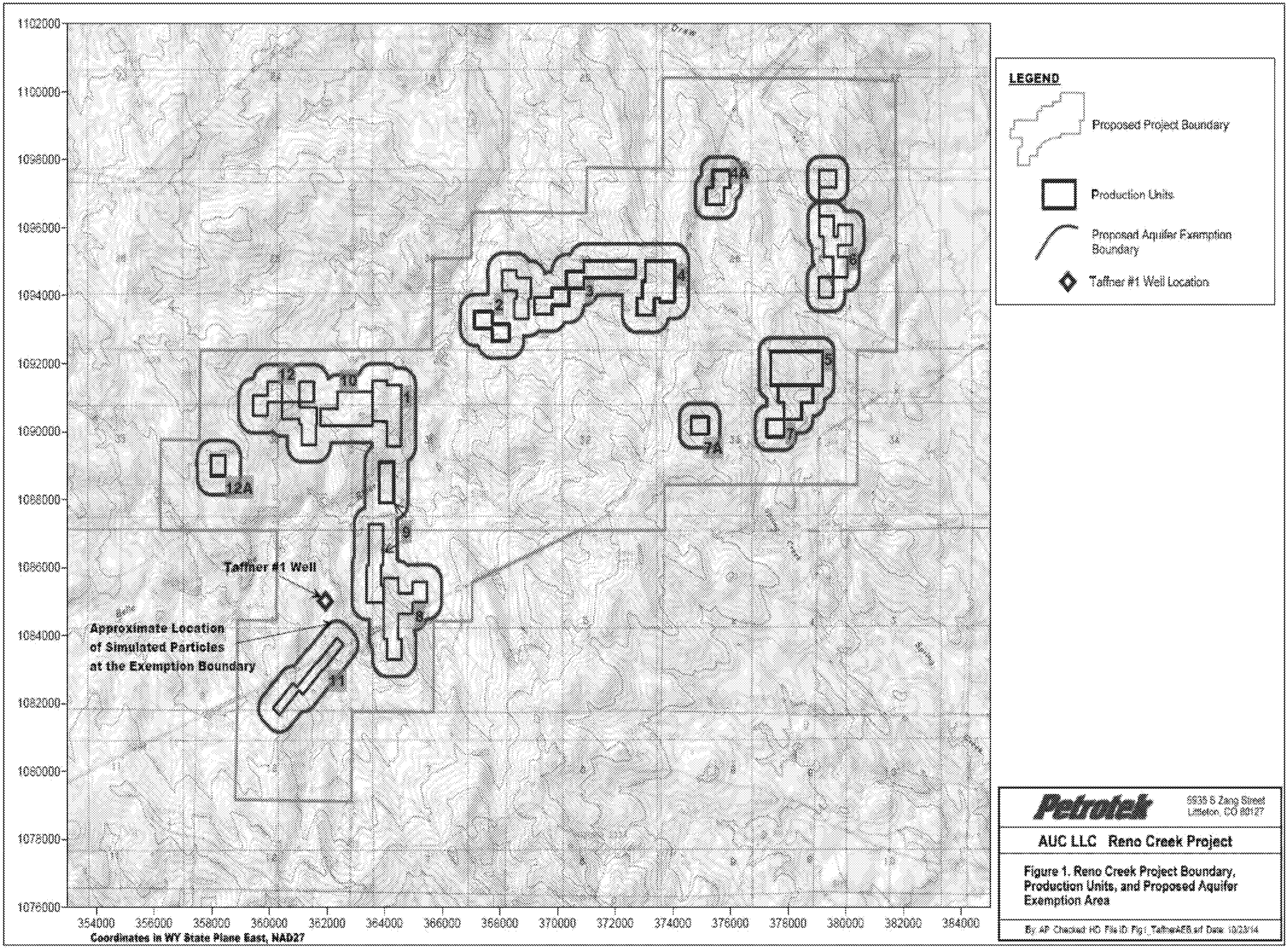
uraniumone
investing in our energy

Figure D12-2
Groundwater Wells within 2 Miles of Christensen Ranch
2016 Aquifer Exemption

Scale: 1:31,680	Date: February 2017	
U1_WC_WaterWells.mxd	By: JLM	Checked: AP

Petrotek
10288 West Chatfield Ave., Suite 201
Littleton, Colorado 80127-4239 USA
303-290-9414
www.petrotek.com

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Reno Creek	Uranium	R8	2015	A scientific calculation of the aquifer exemption distance past the monitor well ring has been prepared that includes several components. One component involves a simple trigonometric calculation of the distance that a potential excursion could extend beyond a monitor ring outline before being detected at a monitor ring well (assuming radial flow). This factor is referred to as ΔT. The second component involves the distance that the excursion can travel from the time of initial detection to the time that recovery operations are implemented (indicated as Δd). The final component is a dispersivity factor (DF) that is applied to account for heterogeneity in the subsurface that can result in movement of an excursion beyond the distances calculated using assumptions of a homogenous isotropic aquifer system.	The monitor well ring at the Reno Creek Project varies according to whether the production unit is located within the fully saturated or partially saturated portions of the Project. In the fully saturated portion of the site, the monitor well ring is placed at a distance of 500 feet from the outer edge of the production unit and the spacing between monitor well ring wells is 500 feet; in the partially saturated portion of the site these distances are placed at 400 feet from the production unit and 400 feet between ring wells. The aquifer exemption boundary beyond the monitor well ring are 120 feet (fully saturated) and 106 feet (partially saturated). The value of 106 for partially saturated conditions is rounded to 110 feet for ease of surveying and plotting on maps for each production unit.	4



Petrotek
5933 S Zang Street
Littleton, CO 80127

AUC LLC Reno Creek Project

Figure 1. Reno Creek Project Boundary, Production Units, and Proposed Aquifer Exemption Area

By: AP Checked: HD File ID: Fig1_TaffnerAEB.srf Date: 10/23/14

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Ross	Uranium	R8	2013 Amended 2016	A science-based calculation has been prepared to establish a reasonable distance beyond the monitor well ring boundary that the Ore Zone aquifer (OZ unit) should be exempted at the Ross ISR Project in Crook County, Wyoming. A scientific calculation of that distance includes three separate components. The first component involves a simple trigonometric calculation of the distance that a potential excursion could extend beyond a monitor well ring boundary before being detected at a monitor well (assuming radial flow). This factor is referred to as ΔT. The second component involves the distance that the excursion can travel from the time of initial detection to the time that recovery operations are fully implemented. This factor is referred to as Δd. The third component is a dispersivity factor (DF) that is applied to the sum of the distance from the monitor well ring to the wellfield plus ΔT plus Δd to account for uncertainty in the parameter values and the dispersion of a constituent in groundwater that could increase the migration distance.	The portions of the Lower Lance and Upper Fox Hills formations identified as the ore zone or OZ aquifer located below the "LC" horizon aquitard and above the Basal Fox Hills lower aquitard, at an approximate depth of 250 to 650 feet below ground surface. It is horizontally described by the monitor well ring plus an additional 100 feet beyond the monitor well ring.	5

R. 68 W. R. 67 W.

E. 706000 E. 708000 E. 710000 E. 712000 E. 714000 E. 716000

12 7 13 18 24 19

T. 53 N.

N. 1490000 N. 1488000 N. 1486000 N. 1484000 N. 1482000 N. 1480000

D ROAD DEADMAN ROAD NEW HAVEN ROAD OSHOTO CONNECTION

68 211 193 164 116

TW01 P74302W

TW02 P103666W

BWELL05 P7430P

OSWELL01 P132537W

MU2-PM01 MU2-PM02 MU2-PM03 MU2-PM04 MU2-PM05 MU2-PM06 MU2-PM07 MU2-PM08 MU2-PM09 MU2-PM10 MU2-PM11 MU2-PM12 MU2-PM13 MU2-PM14 MU2-PM15 MU2-PM16 MU2-PM17 MU2-PM18 MU2-PM19 MU2-PM20 MU2-PM21 MU2-PM22 MU2-PM23 MU2-PM24 MU2-PM25 MU2-PM26 MU2-PM27 MU2-PM28 MU2-PM29 MU2-PM30 MU2-PM31 MU2-PM32 MU2-PM33 MU2-PM34 MU2-PM35 MU2-PM36 MU2-PM37 MU2-PM38 MU2-PM39

MU1-PM01 MU1-PM02 MU1-PM03 MU1-PM04 MU1-PM05 MU1-PM06 MU1-PM07 MU1-PM08 MU1-PM09 MU1-PM10 MU1-PM11 MU1-PM12 MU1-PM13 MU1-PM14A MU1-PM15 MU1-PM16 MU1-PM17 MU1-PM18 MU1-PM19 MU1-PM20 MU1-PM21 MU1-PM22 MU1-PM23 MU1-PM24 MU1-PM25 MU1-PM26 MU1-PM27 MU1-PM28

14-18 24-18 21-19 43-19

NUBETH R&D SITE

Deadman Creek Little Missouri River Draw 15 Draw 16 Draw 17 Draw 18 Draw 19 Draw 20 Draw 21 Draw 22 Draw 23 Draw 24

Basemap: 10' Contours from May 2010 Flight

Drawing Coordinates: WY83EF

0 250 500 750 1,000
GRAPHIC SCALE (FEET)

LEGEND

- PERMIT BOUNDARY
- EPHEMERAL STREAMS
- INTERMITTENT STREAMS
- EXISTING COUNTY ROAD
- DOMESTIC WATER SUPPLY WELL

MONITOR WELLS

- EXISTING REGIONAL BASELINE MONITOR WELL CLUSTER
- PROPOSED PERIMETER MONITOR WELL
- AS-BUILT PERIMETER MONITOR WELL

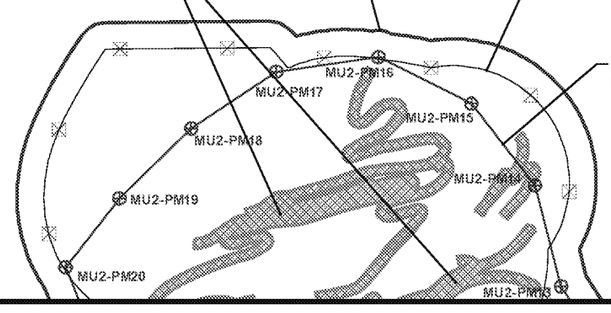
1/4-MILE DOMESTIC WATER SUPPLY BUFFER ZONE

AQUIFER RECLASSIFICATION / EXEMPTION BOUNDARY

APPROXIMATE AREAS OF COMMERCIAL MINERALIZATION

PROPOSED PERIMETER MONITOR WELL RING

EXISTING PERIMETER MONITOR WELL RING



INFORMATION TAKEN FROM MINE PLAN EXHIBIT MP.4-1 AND FIGURE MP.3-1.

STRATA ENERGY

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

REVISIONS	
Date	Description
6/28/12	Edit monitor well ring
7/13/16	Incidental Revision to Aquifer Exemption Boundary for Mine Unit 2 (MU2)
7/29/16	Update approximate areas of commercial mineralization

APPENDIX D-12
MAP D12-1

AQUIFER RECLASSIFICATION / EXEMPTION AREA

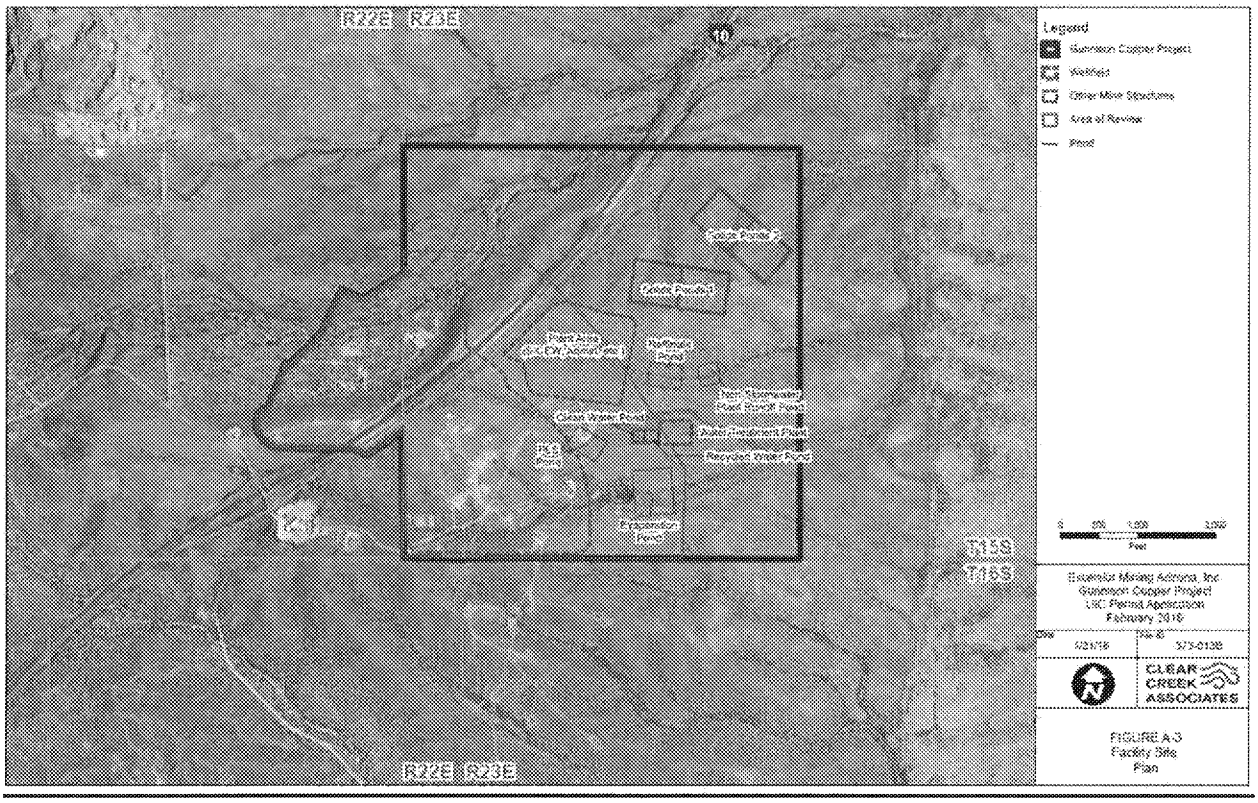
Drawn By: MBM
Checked By: KRC
Date: 6/6/12

FILE: ROSS AQUIFER EXEMPTION R3

WWC ENGINEERING
www.wwcengineering.com

K:\Sheridan\Strata\14143_ACAD_WY83EF\DWGS_AQUIFER_EXEMPTION\ROSS_AQUIFER_EXEMPTION_R3.dwg 8/1/2016 9:49:48 AM mari mgd

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Gunnison Copper Project	Copper	R9	2018	The proposed lateral distance of the AE boundaries from the wellfield is based on existing hydraulic gradients and modeled predictions of the areas of influence of the hydraulic control wells on the east side of the wellfield. These lateral boundaries are as follows: • West: The western boundary of the area proposed for exemption is the boundary of the Gunnison Mine property, which is approximately 100 feet from the nearest proposed injection well. Ground water flows from the west into the wellfield along its western boundary. Due to the high eastward hydraulic gradient, injection flows will be contained by the extraction and hydraulic control wells. • East and North: The area proposed for exemption extends approximately 1,200 feet to the east and at least 250 feet north of the outermost wells in the ISR wellfield. The northeastern boundary of the area proposed for exemption is based on the maximum capture zones for hydraulic control wells on the east and northeastern sides of the wellfield. These hydraulic control wells serve as a barrier to contain pollutants, and the hydraulic control wells' areas of influence, which are critical to pollutant containment, are also predicted by groundwater modeling to be within the AE area along the northeastern and eastern boundaries. • South: The southern boundary of the area proposed for exemption is the south side of the wellfield, which coincides with the property boundary. Modeling predicts that hydraulic containment wells along this boundary will provide containment. Eastward flow gradients and the hydraulic control wells are predicted to provide adequate containment.	The proposed aquifer exemption encompasses 332 acres. This includes the area of the wellfield associated with the mining project plus approximately 1,200 feet to the east (the direction of ground water flow) and at least 250 feet to the north. The extent of the exempted area coincides with the area of review (AOR) delineated for the Class III permit application. The AOR represents the area where injected fluids may endanger an underground source of drinking water (USDW), based on modeling of fluid movement performed by the applicant. This modeling approach, evaluated by the EPA as part of the Class III permit application, incorporates the geologic and operational characteristics of the proposed project.	6



DESCRIPTION OF PROPOSED AQUIFER EXEMPTION

Aquifer to be Exempted: The aquifer to be exempted is in the oxide ore body in which the ISR wellfield will be located and portions of the basal fill above it and the sulfide zone below.

Areal Extent of Aquifer Exemption: The proposed aquifer exemption encompasses 332 acres. This includes the area of the wellfield associated with the mining project plus approximately 1,200 feet to the east (the direction of ground water flow) and at least 250 feet to the north. The extent of the exempted area coincides with the area of review (AOR) delineated for the Class III permit application. The AOR represents the area where injected fluids may endanger an underground source of drinking water (USDW), based on modeling of fluid movement performed by the applicant. This modeling approach, evaluated by the EPA as part of the Class III permit application evaluation, incorporates the geologic and operational characteristics of the proposed project.

Lithology, Total Dissolved Solids (TDS), Depth, Thickness, Porosity, and Hydraulic Conductivity of the Aquifer: Sampling data provided in the operator's Class III permit application reflects samples taken between 2012 and 2015 at various depths within the basin fill, oxide zone, and sulfide zone. The following table presents the lithology, TDS levels, depth, thickness, and average porosity and hydraulic conductivity information about the formations that comprise the aquifer proposed for exemption.

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Burke Hollow	Uranium	R6	2017	The AE was defined by the ability to show uranium deposits in the majority of the Mine Area Boundary in this case. Through exploration and delineation drilling, a large rectangle boundary was selected which captured all deposits discovered at that time. Through the submission of a Mine Area application, UEC was able to demonstrate through water sampling results and geophysical logs that the requested portions of the Goliad Formation have commercially producible levels of uranium. More specifically, that uranium deposits with a GT value of .02 or greater existed throughout the majority of the Mine Area Boundary although all the potential production areas had not been fully delineated. In the original application, UEC requested an AE the same size as the Mine Area boundary. The TCEQ requested evidence that the entire Mine Area included commercially producible levels of uranium before approving the AE. UEC was unable to provide evidence because the entire Mine Area had not been fully explored or delineated. As a result, UEC provided evidence through water sampling results and geophysical logs to support an AE for 5,384 acres of the Mine Area. Distances from existing or future monitor wells was not used to identify the AE boundary.	The AE consists of 5,384 acres from a depth of approximately 32 feet below mean sea level (MSL) to 405 feet below MSL (approximately 162 feet below ground level (bgl) to 535 feet bgl). The uranium mining deposits, Production Area Authorizations (PAA-1) and 2 (PAA2) occur in portions of the Goliad Formation, specifically in the Lower A, the Upper A, and the Lower B Sands.	7

-97.551756 ,28.308818

-97.54107 ,28.305958

North Hunting Camp Well 1

North Hunting Camp Well 3

North Hunting Camp Well 2 - Plugged

-97.545296 ,28.283242

-97.454587 ,28.281468

-97.559016 ,28.269344

South Hunting Camp Well 1

-97.470088 ,28.290309

-97.487777 ,28.236883

Ranch Well 4

Ranch Well 3

Hunting Camp Well 3

5-13-15

STATE OF TEXAS
ANDREW W. KURRUS, III
Geology
2576
LICENSED
PROFESSIONAL GEOSCIENTIST

Andrew W. Kurrus III

UEC Uranium Energy Corp

Subject	Burke Hollow Project Bee County Texas
Title	Figure XI-I
Was Created by	W. Capak
Date	4/2/2014
Revision	3 - 5/12/15

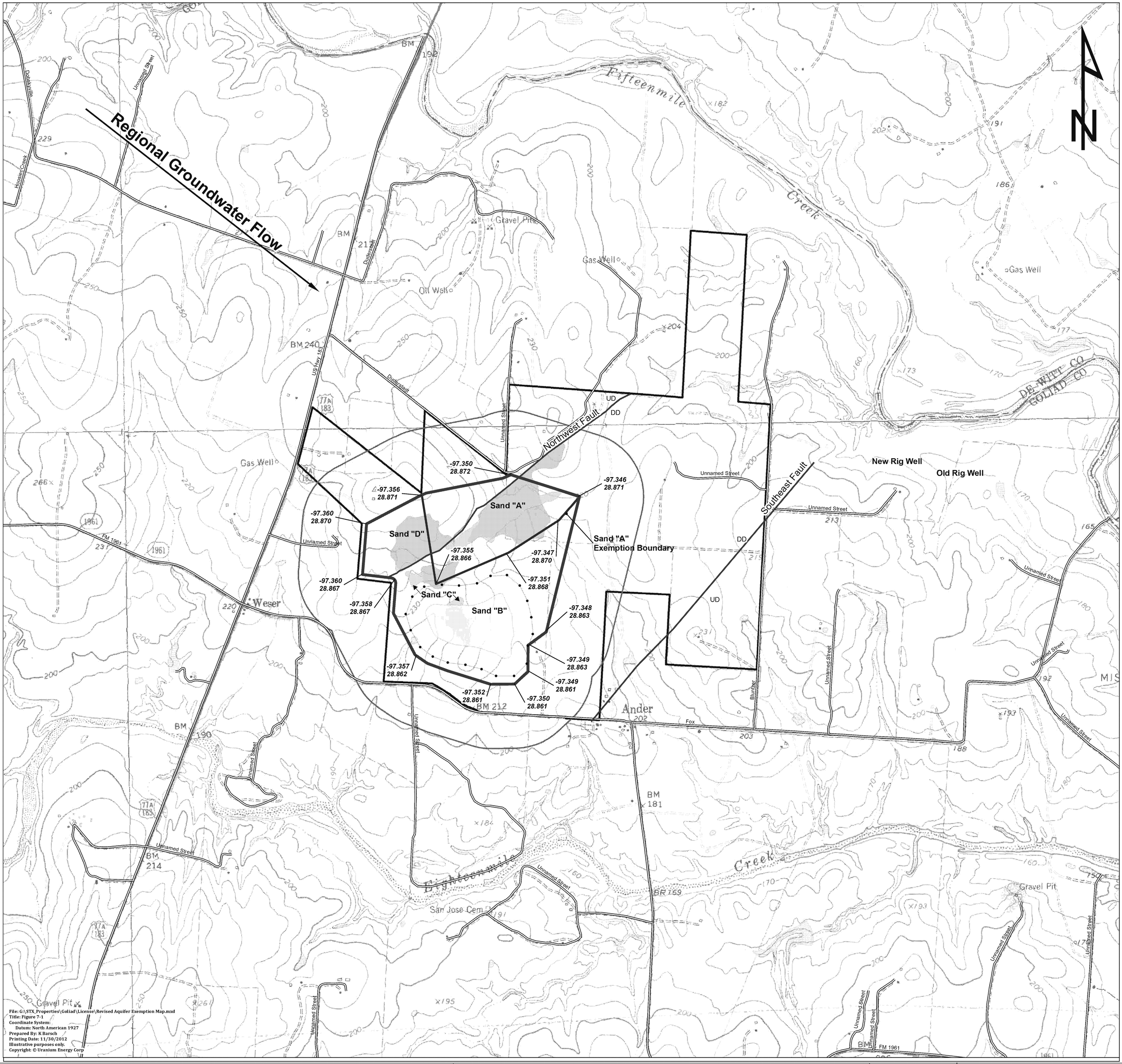
1 inch = 2,000 feet

0 0.3 0.6 1.2 Mile

- Lower Goliad A Sands
- Lower Goliad B Sands
- Quater Mile Area of Review (Aquifer Exemption)
- Aquifer Exemption - 5,384.5 Acres
- Quarter Mile Area of Review (Mine Permit)
- Burke Hollow Lease - 17,510 AC
- Permit Exploration Area - 82,779 Acres
- Mine Permit - 11,359 Acres
- Ranch / Camp Wells
- Groundwater Gradient

USGS Quadrangles: Burkes Ridge, Refugio SW, Papalote, Cranell

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Goliad	Uranium	R6	2012	The initial AE boundary was a large polygon inside the Mine Area that included all three potential and delineated production areas defined more or less by corners of the irregular Mine Area boundary that corresponded to surface leases. After a contested case hearing, the AE was eventually approved after a slight reduction in acreage. The final AE approval was based on the hydrologic isolation of the capture zone for drinking water wells near the exempted area, thus meeting EPA's first regulatory criteria at 40 CFR 146.4(a) that the proposed exemption does not currently serve as a source of drinking water. EPA further determined that the application met the second criterion of 40 CFR 146.4(b), the future source criterion, because UEC's permit application demonstrates that the aquifer contained commercially producible levels of uranium through analytical data from water samples and geophysical logs. Distances from existing or future monitor wells was not used to identify the AE boundary.	The initial AE approved by TCEQ consisted of a portion of the Goliad Formation from a depth of 45 to 404 feet in depth and extended over an area of approximately 424 acres. The polygon area boundary coincided with coordinates approximately 100' inside the corners of surface leases surrounding all existing and future production areas. The final AE approval was reduced from 424 acres to 307 acres. The southeast side of the AE was reduced enough to prevent drinking wells near the exempted area from being in the theoretical capture zone. On the southeast side the AE boundary is basically the monitor well ring while on the north side there is a large buffer.	8



Revised Aquifer Exemption Map

1 inch = 1,000 feet

0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 Feet

Legend

- Fault
- Roads
- Aquifer Exemption Boundary
- Sand A
- Sand B
- Sand C
- Sand D
- PAA-1 Monitor Ring
- Aquifer Exemption.25 Mile AOR*
- Permit Boundary

*AOR - Area of Review

Aquifer Exemption Boundary Acreage:
OriginalTotal Acreage = 423.8
New Total Acreage = 307.03

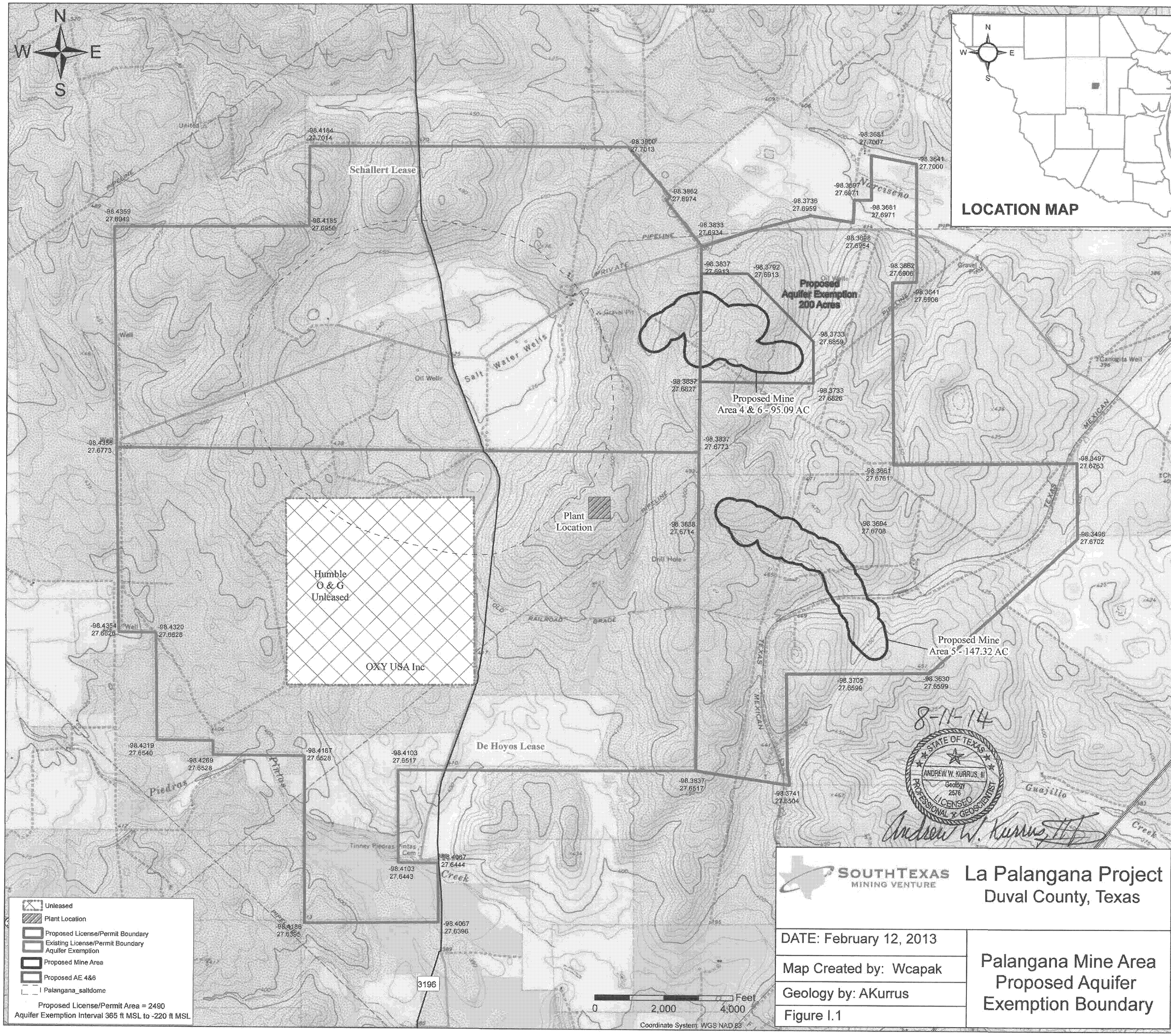
Sand A AE* acreage = 96.17
*AE = Aquifer Exemption

Uranium Energy Corp

Goliad County, Texas
Drawn: 10/28/2008
Checked by: CWH & HLA
Revisions: KB 11/30/2012

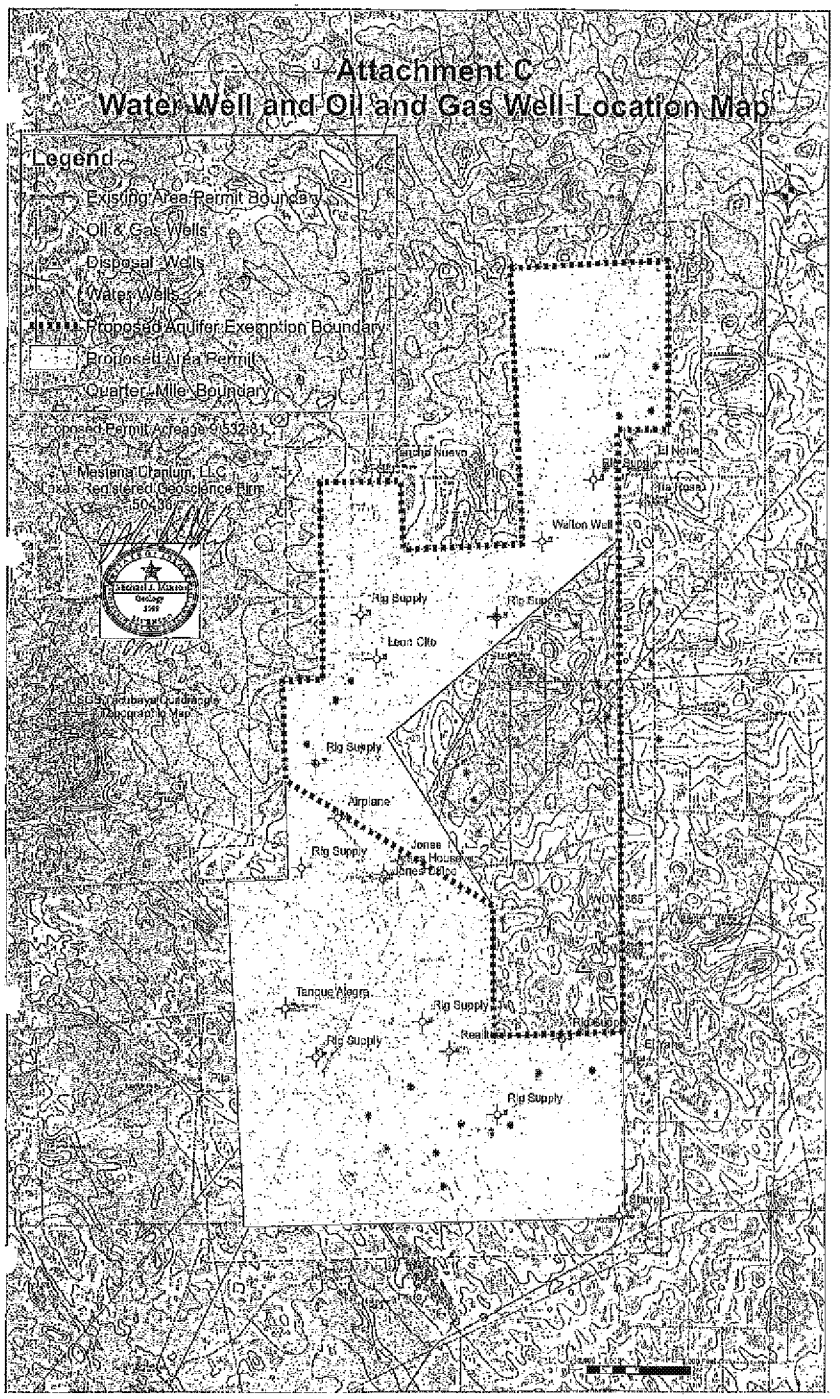
File: G:\STX_Properties\Goliad\License\Revised Aquifer Exemption Map.mxd
Title: Figure 7-1
Coordinate System:
Datum: North American 1927
Prepared By: K Barsch
Printing Date: 11/30/2012
Illustrative purposes only.

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
La Palangana	Uranium	R6	1976/ 2015	Due to the age of this AE, it is unclear what method was used to identify the AE boundary. The initial AE boundary appeared to be the same Mine Area boundary before it was amended and expanded in 2015, When the Mine Area boundary was expanded to encompass a 4th production area, the Mine Area boundary overlaid existing landowner boundaries for a simple expansion. However, the 4th production area had been delineated such that no additional mining expansion would be needed in the future. Therefore, the amendment to request expansion of the AE boundary included an adjacent polygon around the planned monitor well ring with a 400' buffer as the new AE boundary. The TCEQ determined that the area met the requirements for an AE because there were no wells that withdrew water for human consumption within the designated area or ¼ mile AoR. The TCEQ also found that the designated aquifer would not in the future serve as a source of drinking water for human consumption because it contained concentrations of uranium, radium-226, arsenic and selenium (primary drinking water standards) and chloride, sulfate, iron, total dissolved solids and manganese (secondary standards) above TCEQ and EPA drinking water standards for public water systems. It was also demonstrated with geophysical logs that the formation is a mineral, hydrocarbon or geothermal energy bearing with production capability, as demonstrated by previous mining activity at the project.	Texas became primacy in 1982 after many uranium projects had already been in progress. The initial AE included 6,272 acres in the Goliad formation from 365 ft. msl to -220 ft. msl. The AE boundary was expanded in 2015 from 6,272 to 6,472 with a depth of 260 ft. msl to -66 ft msl. for a fourth production area.	9



N
S
W
E
LOCATION MAP
Schallert Lease
De Hoyos Lease
Humble
O & G
Unleased
OXY USA Inc
Plant
Location
Proposed
Aquifer Exemption
200 Acres
Proposed Mine
Area 4 & 6 - 95.09 AC
Proposed Mine
Area 5 - 147.32 AC
Salt Water Wells
PIPELINE
OLD RAILROAD GRADE
Narciseno
Piedras
Creek
Guajillo
Drill Hole
Oil Wells
Well
3196
8-11-14
STATE OF TEXAS
ANDREW W. KURRUS, III
Geology
2576
LICENSED
PROFESSIONAL GEOSCIENTIST
Andrew W. Kurrus, III
SOUTHTEXAS
MINING VENTURE
La Palangana Project
Duval County, Texas
DATE: February 12, 2013
Map Created by: Wcapak
Geology by: AKurrus
Figure I.1
Palangana Mine Area
Proposed Aquifer
Exemption Boundary
Unleased
Plant Location
Proposed License/Permit Boundary
Existing License/Permit Boundary
Aquifer Exemption
Proposed Mine Area
Proposed AE 4&6
Palangana_saltdome
Proposed License/Permit Area = 2490
Aquifer Exemption Interval 365 ft MSL to -220 ft MSL
0
2,000
4,000
Feet
Coordinate System: WGS NAD 83

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Alta Mesa	Uranium	R6	2013	It is unclear what method was used to identify the AE boundary. On June 21, 2012, Mestena Uranium, LLC (Mestena) submitted an application for a Class III Injection Well Area Permit renewal and major amendment that included) a request for expansion of a designated exempted aquifer at the Alta Mesa In Situ uranium mining site in Brooks County, Texas. The original AE boundary encompassed PAA-1 through PAA-6 and was bounded by the permit boundary on the east. The amended AE boundary add the area of PAA-7 as well as additional area west of the original AE out to the west permit boundary. The TCEQ determined that the area met the requirements for an AE because there were no wells that withdrew water for human consumption within the designated area or over the vertical extent of the expanded zone proposed for exemption. The TCEQ also found that the designated aquifer would not in the future serve as a source of drinking water for human consumption because it contained concentrations of uranium, radium-226, arsenic and selenium (primary drinking water standards) and chloride, sulfate, iron, total dissolved solids and manganese (secondary standards) above TCEQ and EPA drinking water standards for public water systems. It was also demonstrated with geophysical logs that the formation is a mineral, hydrocarbon or geothermal energy bearing with production capability, as demonstrated by previous mining activity at the project. Distances from existing or future monitor wells was not used to identify the AE boundary.	The expansion increases the area of the aquifer exemption from 1,840 acres to 5,457 acres in Brooks County, Texas, and expands the vertical extent of the exempted zone from the top of Sand B to the base of Sand C of the Goliad Formation (current aquifer exemption), to the top of Sand Bat 100 feet above mean sea level to the base of Sand D at 370 feet below mean sea level of the Goliad Formation.	10



Extended Aquifer Exemption Map, Mestena Uranium, LLC, Brooks County, Texas

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Crow Butte	Uranium	R7	1990	It is unclear what method was used to identify the AE boundary. The EPA approval of the aquifer exemption was based on criteria established in EPA regulations (40 CFR 146.4). No one was identified as currently using water for human consumption from the Chadron Aquifer in the specific lateral boundary in the entire 3,000 acre area the State requested for exemption. EPA found that it has clearly been demonstrated that the portion of the Chadron Aquifer cannot now and will not in the future serve as a source of drinking water because it includes a zone which is mineral bearing and is commercially producible. Distances from existing or future monitor wells was not used to identify the AE boundary.	The portion of the Basal Chadron aquifer within the 3,000 acre lateral area of the Chadron Aquifer (Dawes County, NE).	11

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
North Trend	Uranium	R7	2011	Aquifer exemption is based on criteria established in Title 122, Chapter 5, Section 004. The Director has determined that the exempt portion of the aquifer does not currently serve as a source of drinking water. No one was identified as currently using water from this aquifer within the proposed exemption boundary for human consumption. The exempt portion of the aquifer cannot now, and will not in the future, serve as source of drinking water because the exempt aquifer contains minerals that, due to their quantity and location, are expected to be commercially mined. The aquifer exemption area includes a mineral bearing zone based on water quality data showing significant levels of radionuclides, particularly radium and uranium, and is commercially producible by in-situ leach method based on the results of pump tests conducted in the aquifer indicating favorable transmissivity and hyrdraulic conductivity. The aquifer exemption area cannot now, and will not in the future, serve as source of drinking water because the aquifer portion is so contaminated that it would be economically or technically impractical to render that water fit for human consumption. The Basal Chadron aquifer within the NTEA qualifies as an "underground source of drinking water" as defined in Title 122, Chapter 1, based on the results of CBR's analysis of ground water samples taken from this formation that show Total Dissolved Solids values less than 10,000 milligrams per Liter (mg/L). Analysis of ground water samples taken by CBR from this aquifer have significantly exceeded maximum contaminant levels for radium and uranium. Distances from existing or future monitor wells was not used to identify the AE boundary.	The North Trend Expansion Area permit includes approximately 1,165 acres, and the production zone associated with the proposed Class III permit ranges from an approximate depth of 350 feet below ground surface at the northern and southern permit boundary to 700 feet below ground surface in the center of the permit boundary.	12


Attachment A
T 32 N
T 31 N
T 32 N
T 31 N
R 52 W
Crawford
Miles
0 0.25 0.5 1
North Trend
Expansion Area
Aquifer Exemption
Boundary

Project Name	Commodity	EPA Region	Year	Method Used to Define AE Boundary	AE Boundary Description	Source
Church Rock Section 8	Uranium	R6	1989	It is unclear what method was used to identify the AE boundary. EPA granted the aquifer exemption for Section 8 because it satisfied the 40 CFR § 146.4 criteria in (a) and (b)(1). The section 8 portion of the aquifer so exempted is, in fact, not a suitable source of drinking water now (because the minerals in question, (uranium and associated naturally occurring radionuclides radium and radon) are present in concentrations that are orders of magnitude above existing or proposed SDWA limits and will remain so even after successful restoration is completed. Distances from existing or future monitor wells was not used to identify the AE boundary.	Church Rock SW ¼ Section 8, 160-acres.	13

Sources:

1 U.S. EPA Region 8, 2019, Underground Injection Control Program Proposed Aquifer Exemption Record of Decision. https://www.regulations.gov/docket?D=EPA-R08-OW-2019-0512

2 Powertech (USA) Inc, 2012, Dewey-Burdock Project Class III Underground Injection Control Permit Application. https://www.epa.gov/uic/dewey-burdock-permit-application

3 Wyoming Department of Environmental Quality Water Quality Division (WDEQ-WQD), 2020, Underground Injection Control Program Statement of Basis Willow Creek (Christensen Ranch) In-Situ Recovery (ISR) Project.

4 AUC LLC, 2013, The Reno Creek ISR Project WDEQ/LQD Permit to Mine Application Addendum D12-D.

5 U.S. EPA Region 8, 2016, Letter from EPA to Kevin Frederick (WDEQ-WQD) RE: Class III Aquifer Exemption Request, Strata Energy, Inc. Ross Uranium ISR Project, Crook County, Wyoming.

6 U.S. EPA Region 9, 2018, Letter from EPA to Stephen Twyerould (Excelsior Mining Arizona, Inc.) RE: Aquifer Exemption for the Gunnison Copper Project Site, Cochise County, Arizona.

7 Craig Wall, 2020, Personal communication between Beth Kelly, WWC Engineering, and Craig Wall, Uranium Energy.

8 Craig Wall, 2020, Personal communication between Beth Kelly, WWC Engineering, and Craig Wall, Uranium Energy.

9 Craig Wall, 2020, Personal communication between Beth Kelly, WWC Engineering, and Craig Wall, Uranium Energy.

10 Texas Commission of Environmental Quality, 2013, Aquifer Exemption Order Mestena Uranium, LLC.

11 Environmental Protection Agency and the Nebraska Department of Environmental control; Underground Injection Control Program Revision; Aquifer Exemption Determination; 55 Fed. Reg. 21,191 (May 23, 1990).

12 Nebraska Department of Environment and Energy, 2011, Updated Information on Crow Butte Resource North Trend Expansion. http://deq.ne.gov/NDEQProg.nsf/OnWeb/CBR-1

13 EPA, 2006, Appendix of Exhibits to Written Comments of HRI, Inc. in Support of the Position that the Section 8 Land in Question is Not Indian Country as Defined in 18 U.S.C. § 1151(B) and State of Alaska v. Native Village of Venetie Tribal Government, 522 U.S. 520 (1998).